

THURSDAY, OCTOBER 17, 1895.

RECENT ORNITHOLOGY.

The Land Birds in and around St. Andrews. By George Bruce. (Dundee : John Leng, 1895.)

The Migration of British Birds, including their Post-Glacial Emigration, as Traced by the Application of a New Law of Dispersal. By Charles Dixon. (London : Chapman and Hall, 1895.)

Heligoland as an Ornithological Observatory, the Result of Fifty Years' Experience. By Heinrich Gätke. Translated by Rudolph Rosenstock, M.A. Oxon. (Edinburgh : David Douglas, 1895.)

A Hand-book to the Game Birds. By W. R. Ogilvie-Grant. Vol. i. Sand-grouse, Partridges, Pheasants. (London : Allen and Co., 1895.)

The Land-birds and Game-birds of New England, with Descriptions of the Birds, their Nests and Eggs, their Habits and Notes. By H. D. Minot. With illustrations. Second edition. Edited by William Brewster. (New York : Houghton and Co., 1895.)

Wild England of To-day, and the Wild Life in it. By C. J. Cornish. (London : Seeley and Co., 1895.)

The Pheasant: Natural History. By the Rev. H. A. Macpherson. *Shooting.* By A. J. Stuart-Wortley. *Cooking.* By Alexander Innes Shand. (*The Fur and Feather Series.*) (London : Longmans, Green, and Co., 1895.)

NO section of vertebrate zoology has in this country attracted more amateur disciples than ornithology; and the literature of perhaps no other group has been burdened by so many useless contributions by writers who, possessing not only little literary qualification for the task, but a very superficial knowledge of the subject, rush into print, assuming that, because they are able to see, they are capable of observing, which are two very different things. Among the number of such contributions must be included a volume of 563 closely-printed octavo pages on "The Land Birds about St. Andrews," by Mr. George Bruce. On the book opening of its own accord at p. 44, the heading of "The Griffon Vulture" caught the eye and surprised us not a little; for the addition of this majestic bird to the avifauna of Fifeshire was quite new to us. On consulting the title-page, however, we discovered that the work was of wider scope than indicated on the cover, and included "a condensed history of the British land birds, with extracts from the poets and observations and anecdotes on natural history." "The single occurrence of a solitary specimen" in Ireland, recorded by Yarrell, is apparently sufficient excuse for this page of padding. A carefully-written account of the birds of Fifeshire would have been welcomed to our lists of local faunas; but with so many excellent histories of British birds in existence (such as that by Mr. Howard Saunders, to mention only one), there was hardly a call, one would have thought, for another, except it were commended by some special feature or novel method of treatment. The special features of this book appear to consist in the superabundant extracts from the poets—more or less, generally less, *à propos*—cuttings from the local newspapers, and quotations from

many other sources equally authoritative. Although the "history," such as it is, is very condensed, and not always to be taken on trust, and the anecdotes poor and pointless, there are, nevertheless, in the book not a few observations which we are confident will prove new to most ornithologists. Of these we cull a few, and refer our readers, who desire to dig deeper, to the book itself for others.

"The Isle of Man has proved one of the best stations in Scotland for migration observations."

"The species means every individual bird in creation; for instance, a lark is one species. . . . A genus is a group of these birds so closely resembling each other as hardly to be mistaken, as the raven, the carrion crow. . . . These combined form the genus called *Corvus*, which means in British [*sic*] crow. The plural of *Corvus* is *Corvine*, as genera is the plural of genus."

"Among those naturalists who have recently [*!*] done so much for the advancement of this branch of science Temnick [*!*] and Montague [*!*] deserve to be ranked amongst the first."

Mr. Bruce records the occurrence of the nightingale as far north in Scotland as Paisley and Uddingston, upon the unquestioned authority of one James Anderson in a letter to a local newspaper, apparently. The *Struthionida*, we find here, are represented in the British Isles by the genus *Otis*, and that the author of the species *Ulula stridula*, *Salicaria arundinacea*, and *S. phragmites* is Mr. George Bruce, of St. Andrews! According to the title-page he is also the author of "Destiny and other Poems," of which we must confess our ignorance. We trust, however, that the doom of "The Land Birds of St. Andrews" may have no prejudicial effect on his earlier volume.

"The Migration of British Birds" is the new work by Mr. Charles Dixon, which was heralded a short time ago by an article in the *Fortnightly Review* from his own pen. This author's previous volume on a similar subject was exhaustively discussed in NATURE for December 1892. Or that occasion the deliberate conclusion was expressed "that Mr. Dixon, author of so many works as he may be, is no authority on the subject of migration, which he has left exactly as he found it." The same verdict must be passed on the present volume, and we might have dismissed it without further discussion but for two reasons. The first is the fact that in one or two important daily journals, whose scientific reviews in general command our entire respect, Mr. Dixon has been rather prematurely elevated to the rank of a Moses in ornithology, and the other is that he declares that his present views are now opposed to those he has expressed in previous works. Whether the abandonment by Mr. Dixon of his former views is due to the criticism to which they were subjected in NATURE, we have not the satisfaction of being informed.

This "new Law" here promulgated to the world—not yet accepted by it—is the "undiscovered principle" which is to solve all the difficulties of geographical distribution, and the dispersal of life, and clear up "the greatest mystery which the whole animal kingdom presents," to quote the words of one of our foremost ornithologists—"a mystery which attracted the earliest writers, and can in its chief point be no more explained by the

modern man of science than by the simple-minded savage or the poet or prophet of antiquity." When writing these pregnant words it was not given to this erudite biologist to foresee the revelation of "this Our new law" of dispersal to Charles Dixon, of which the volume under notice is the first proclamation. This great new "law forbids retreat." To Mr. Dixon it has been revealed that the effect of the slow oncoming of a glacial epoch in either hemisphere was not to cause bird-life to retreat in front of the increasing cold, but really to exterminate all those birds having a range of distribution entirely within the refrigerated areas, and to contract the range of such as were migratory. Those birds alone survived, therefore, whose former range extended beyond the glaciated areas (the unglaciated portions of their range the author calls "refuge areas"); while all those birds which had no refuge area were totally exterminated, and have since been lost to science. The "law," moreover, forbids species in the northern hemisphere ever to increase their range in a southerly direction, and species in the southern hemisphere ever to increase theirs in a northerly direction; and only those northern birds or those southern birds whose refuge areas extended on both sides of the equator are permitted by the "law" to extend their breeding range to regions towards the opposite pole, which presented the most favourable conditions for reproduction. Now "this Our law," we are told, applies not only to birds, but to all life, and is a universal explanation never thought of by any other "biologist of note," of the migration and geographical distribution of species. To show that this is so, Mr. Dixon applies his law to the distribution of "arctic" types in the flora of the southern hemisphere. Sir Joseph Hooker long ago explained the presence of the "Scandinavian" element in that flora, by indicating its migration routes along the meridional highlands of the great continental land masses. Hooker, Huxley and Wallace, and doubtless all those other ornithologists and geologists—among whom are Sharpe and Geikie—who have, according to Mr. Dixon, gone "beyond their last," have been quite misguided by reason of their ignorance of this law. Our latest authority, however, declares with all the emphasis of certainty that "there can have been no emigration of plants from north to south"; "it could never have taken place"; Our "law forbids it." The true solution of the question by Mr. Dixon is, that all the "arctic" plants in the southern as well as in the northern hemisphere, spread from an equatorial centre. Let us take, for example, an "arctic" species common, say, to high northern latitudes, and to New Zealand, and the Southern Andes or South Africa. This species must, in the first instance, have arisen in some part of the equatorial regions from a tropical form, by ascending to the cool arctic zones of one of the mountains—suppose in South America. It must then have followed one of two routes of dispersal. After multiplying it must either have spread right round the equator—the absence of continuous land notwithstanding—crossing again and again the torrid interspaces separating it from other equatorial altitudes, which served it as stepping-stones, till it attained those longitudes whence it could extend its range, as best it might, to its present northern and southern habitats—a migration-

route too remarkable to be easily credited. The alternative route, so far as regards the southern hemisphere, at all events, would be for the species to spread southwards on one of the continents (say South America), till reaching a then-existing Antarctic land, over which it must have gradually dispersed, and in order to reach South Africa or New Zealand, it would have to travel northwards in the very face of Mr. Dixon's inexorable law, which it would thus entirely upset, and with it all the conclusions in the present treatise. How would Mr. Dixon explain, for instance, the distribution of *Petræa arborea* in South America, in West Java, and East Timor? Another method of dispersal may perhaps be predicated as possible by some, namely, the *independent* origin from equatorial ancestors of identical arctic species in high northern and southern latitudes; but any such occurrence is too improbable to be seriously entertained.

This law, which seems to us to fail most lamentably to explain the dispersal of plants, fails not less in regard to the migration of birds. It surely requires no pointing out that during every winter we have numberless boreal species—birds, whales, seals—visiting our shores in retreat south into more genial climes; the sheep feeding on any high hill, and overtaken at the beginning of winter by storms, hasten for food and shelter to lower levels, where they would continue to remain if there came no moderation in the weather of the uplands; and our resident redbreasts for the same reason retreat from the woods before the first snows to the neighbourhood of our homes, and if the winter be specially severe they retreat still further in search of more genial conditions—they do *not* dare the storm and die on the snow. What takes place in miniature during the winter would simply be enacted, there is little doubt, on an extensive scale during a glacial epoch. The migration, to be seen to-day in Western Europe, we are told by Mr. Dixon, was undoubtedly initiated with the passing away of the third glacial period, is undertaken expressly for purposes of reproduction, and is "the constant endeavour of what we must now regard as but the relics of such exiled life to regain and repeople the area that it once occupied during pre-glacial time." Had the migration of pre-glacial times a different cause or motive than that of to-day? Why is migration necessary for the purposes of breeding? Is there not space enough, food enough, and a better climate in the regions where the migrants winter, and to which the parents, indeed, return reinforced by their young, to be dependent on the supplies of that area? How, we may also ask, can the birds which occupied the southern and non-glaciated portion of their range be inspired by "a constant endeavour to regain" an area their parents had never occupied, and had never even known; for those of their species which had occupied and known the northern part of the range, we are assured rather than retreat a step, chose to die under Dixon's "law." The new Commandment which forbids a southern extension of breeding area, "renders," according to Mr. Dixon, "a flight south in spring impossible"; and "all species do not breed [more grammatically, no species breeds] anywhere south of their [its] point of entrance." Yet the penguins defy this law, and though southern hemisphere birds, they migrate equator-wards to breed. In the spring of this year the present writer witnessed, in

the middle of the Irish Sea, a flock of migratory birds crossing (the weather having been specially fine for some time) to England, from Ireland apparently, on a *south-east* course. Before crediting this lob-sided partially-radiating dispersal, we must have more convincing proofs that birds and plants are so peculiarly constituted that an invisible parallel of latitude athwart a congenial region, is, in a particular compass bearing, as impassable to them as an ocean or a sahara. We cannot affect to believe that Mr. Dixon's is a more satisfactory explanation of the mysterious season-flight of birds, than the cause—among others—long ago assigned, that the migrant species come north in spring to breed, impelled by a hereditary impulse at that season (and probably guided by a direction-sense with which they are specially endowed), to return to their old nurseries from the regions whence their ancestors were compelled by geologic and climatic causes to retreat, and in which they were so long acclimatised as to be now unable to withstand the cold winter, with its meagre fare, of their ancestral *patria*, which consequently they forsake again in the autumn.

We cannot afford space to touch on many other points in Mr. Dixon's book in which we believe he has gone astray. We feel no nearer a solution of the mystery of migration than before its publication. Writers on this subject "should thoroughly understand not only the rudiments of the higher philosophy [whatever that may mean] of the geographical distribution of life before they attempt to theorise upon it, or endeavour to demonstrate it." We offer Mr. Dixon his own advice, which we have copied from a paragraph in which a charge of *ultra crepidam* is ill-naturedly levelled at some of the foremost workers in the science with which he is dealing, and to which their lifetime has been unremittingly devoted—a charge which surely comes ill from one who is purely an amateur, and a young man compared with the veterans at whom he sneers.

Mr. Dixon's style is cumbersome and not always easy to comprehend, while his English is often very ungrammatical. It is only justice to admit that the book, with the *theories* of which we so entirely disagree, contains much interesting information collated and condensed from many sources.

It is refreshing to turn from these airy speculations to the stable ground of pure and unadulterated fact with which the pages of "Heligoland as an Ornithological Observatory" are so lavishly filled. This is the English translation by Mr. Rosenstock of Herr Gätke's celebrated volume published in German in 1890. Ornithological students in England owe their heartiest thanks to the translator, as well as to Mr. Harvie Brown, to the publishers, and to all who have given a forwarding hand to the task of presenting them with this great and important work in their own language. The labours of its venerable and distinguished author are too well known in this country to require us to do more than recommend his book—corrected by the author down to May last—in its new garb. Binding, printing, paper, and illustrations are all that can be desired. In turning over its pages we recognise anew the trustworthy observer, and are reminded of the story told of an old woman in a northern county

of Scotland, who, on being taken to task by her minister for invariably paying the closest attention to any stranger who occupied the pulpit, and of as persistently sleeping in unbroken repose throughout his own sermons, replied, "Hoot minister! wha's to ken fat kin' o' doctrine they youngsters may be gi'in'; we a' ken fine that we can lippen to yoursel'." Herr Gätke's book can be perfectly "lippen"-ed to. It is divided into three parts, the first of which—on the migration of birds—is perhaps the most important and interesting. This subject is discussed in nine chapters, dealing with the course of migration in Heligoland; the direction, altitude and velocity of the migration flight; the meteorological conditions influencing it; the order of migration; exceptional phenomena; what guides the birds, and the cause of the movement. In regard to the last, we quote the conviction of this patient observer and recorder after fifty years' experience, "that what at present has been ascertained in reference to the migration of birds furnishes us with no clue, by the aid of which we are enabled to penetrate the depths of this wondrous mystery." The second part deals with changes which he has observed to occur in the colour of the plumage of birds without moulting. This subject has also been studied by Mr. Ogilvie-Grant, of the British Museum, who has not only corroborated the truth of Herr Gätke's observations, but thrown much new light on the subject. The final section of the book gives an account of the birds observed in Heligoland, which number 398. The volume is illustrated by a number of charming vignettes, and by two excellent portraits of Herr Gätke.

The latest addition to the naturalist's library, edited by Dr. R. B. Sharpe, and published by Messrs. Allen and Co., of Waterloo Place, is a "Hand-book to the Game-birds," by Mr. W. R. Ogilvie-Grant, who is well known to be an authority on this group. This is the first of two volumes, and contains an account of the sand-grouse, partridges and pheasants. The second volume (which will be issued shortly) will deal with the American partridges, the megapodes, curassows and hemipodes. The hand-book is founded on the author's British Museum catalogue of the group (vol. xxii.), and is one of the best yet issued of the valuable series to which it belongs. So far as published, the volumes of Allen's Naturalist's Library are each of them concise monographs of the groups they relate to, well illustrated and published at a very low price. The aim of the author has been to treat the subject in such a way that it may not only be useful as a scientific work of reference, but also as a handy book for sportsmen and field naturalists. With its aid they should be able not only to identify the birds they shoot with as little trouble as possible, but also to find out what is known concerning the life-history of each species. The work will be specially valuable to the museum curator; indeed, it is the only handy and up-to-date monograph of the families it describes. This volume contains twenty-one full-page coloured illustrations, some of which are republished from Jardine's Naturalist's Library; the majority, however, have been specially drawn for it by Mr. Keulemans. It is to be regretted that Messrs. Allen do not see it to their advantage to dispense with the

antiquated figures of the former edition, for when they are placed beside Mr. Keulemans' beautiful plates, the contrast is too striking not to call forth unfavourable remark. The birds from the hand of that artist seem transported fresh from the heaths and the hills; the others look like worn museum specimens. A special feature in Mr. Ogilvie-Grant's hand-book, is the full account given of the various phases of the moult in the grouse, partridge and blackcock, and of the curious change of plumage that takes place in these birds without moulting. We are indeed indebted, as observed above, to him more, we believe, than to any other, for the elucidation of these interesting, and to a great extent inexplicable, variations. The account he gives of the plumage-changes in the blackcock (*Lyrurus tetrix*) have never till now been so fully described. We understand that the description of both male and female of every species has been carefully made from the actual skins, and checked with the specimens, in proof. This is sufficient to establish the accuracy and value of Mr. Ogilvie-Grant's work. The only doubtful statement we have detected is on p. 189, where the author has stated, following the authority of Sir Walter Buller, that the New Zealand quail, now extinct in that colony, still exists on the Kermadec Islands. We are inclined to believe that its discovery on the latter island was a mistake, and that this interesting bird is now absolutely exterminated.

"The Land-birds and Game-birds of New England" is a new edition of this local fauna published some nineteen years ago. Its author is the late Mr. Henry D. Minot, who, as we learn from a biographical notice which prefaces the book, had from early childhood showed a great fondness for nature, and who, devoting himself to the study of birds, had completed the manuscript of this volume of over 400 closely-printed pages in his seventeenth year. This new edition issues from the press under the care of the distinguished ornithologist, Mr. W. Brewster, who says that the book was well received on its appearance, sold rapidly, and soon became out of print. Mr. Minot adopted the profession of a railroad engineer, and for fifteen years lived in the hope of adding to, and correcting his published observations. His duties, however, prevented him from accomplishing this task, and his career terminated in 1890 by his being killed in a railway collision. Written by a youth of seventeen, as the editor observes, "with, as I am assured, almost no outside help of either a literary or scientific kind, it is a remarkable and interesting book, for most of the [bird] biographies relate to his own experiences or impressions." The book is certainly worth republishing. The original text has been left almost untouched, and a few notes found in Mr. Minot's annotated copy are inserted at the foot of the pages. As could not but happen in one so young, there are not a few errors, both of fact and deduction; but the "editorial touches" of Mr. Brewster have safeguarded the reader against being misled, and given to the book much of the value it now possesses. Mr. Minot was a keen observer, and the worth of his work, apart from what it possesses as a local fauna, and from Mr. Brewster's annotations, lies in his field notes on the habits of the New England birds. Future monographers will find in it much accurate and interesting material, recorded in a pleasant and easy

style. In speaking of the quail (*Colinus virginianus*), he readily describes the unsuccessful pursuit of a covey by a young "gunner," and concludes: "Now the lad returns home, and explains his ill-luck by an extraordinary theory, read of in books, and verified by his own experience, that our Quail have a wonderful power of retaining their scent. The only sound argument to prove this statement is that our game-birds, when very young, by a thoughtful provision of nature, emit little or no scent." In later years the author added this note. "... When game-birds drop suddenly to the ground and remain motionless, the dog does not perceive them. Quail most frequently alight in this way, but as soon as they begin to move, the effluvium escapes and is disseminated." Mr. Brewster adds his "editorial touch" to the following effect: "The question cannot be settled in this summary manner, for the writer overlooks the important fact that the habit of retaining scent is not common to all the quail of any one locality or region. On the contrary, it is peculiar to certain individual or bevs who invariably practise it when pursued by sportsmen. Yet these individuals do not drop more suddenly, nor remain more motionless, than the less fortunate birds which the dogs easily find and point." Thus author and editor.

The illustrations consist of woodcuts in outline, but though "drawn from nature," are of no practical use, and might have been omitted with advantage. The book is well printed, and has, as frontispiece, a portrait "prepared and engraved by Mr. A. F. Jaccaci as a personal tribute" to the talented but unfortunate author.

In "Wild England of To-Day," by Mr. Cornish, we have a collection of essays republished from different journals, but chiefly from the *Spectator*, describing the life in various "wild," secluded or thinly populated districts of the country "ranging from the southern cliffs to the Yorkshire fen." Although we find such subjects discussed as "salmon-netting at Christchurch," "trout-breeding," and "the deer in Richmond Park," the majority of the papers are devoted to bird-subjects, and thus come lawfully within the scope of this article. The whole of the sketches, while quite popularly written, are scientifically accurate, without being or pretending to be permanent contributions to science. Charming in indit, they remind one of the style and flavour of the late Richard Jefferies' psalms in praise of nature. The book is adorned by a number of full-page illustrations of exceptional excellence, from photographs and from drawings specially made for it, of which the "Peewit's Nest," by J. W. Oakes, A.R.A., deserves special mention as an exquisite little picture.

The latest addition to the attractively bound "Fur and Feather" series, whose volumes form such pleasant journeying companions, is "The Pheasant." The Rev. H. A. Macpherson treats, as he does in several of its predecessors, of the natural history of the bird. He discusses concisely its acclimatisation from the earliest times, its geographical distribution and its nesting habits, while under the heading of "Freaks and Oddities" he describes its plumage-changes and its cross-breeding. His section concludes with two chatty chapters on "Old World Fowling" and "Poaching in the Nineteenth Century."

Mr. Stuart-Wortley discourses with authority on how to shoot—slaughter?—this tame “Byrd of singular beauty,” when driven in beves slowly and with not a little persuasion just sufficiently far away to “home,” on being flushed, at a proper altitude over the guns, which are thickly stationed in hiding to rain a murderous hail on them. The shooting of the wild-bred bird is, however, nobler sport. “Nothing strikes one more in Norfolk,” says Mr. Stuart-Wortley, “especially in the heath district, than the prevalence of pheasants everywhere . . . and it adds greatly to the charm of a partridge drive when it is varied by a few rocketing pheasants out of the belt you are standing by, or when they rise high off the heath and come over with the partridges, and quite as fast. . . . The late October days in Norfolk and Suffolk, especially where there is heath, are among the most fascinating to be got in England.”

Mr. Innes-Shand plays on our salivary glands by extolling the excellence of the bird “when she is in the dish,” roast and with bread-sauce, and in many a fascinating style besides that “sublimest form of art . . . the *faisan à la Sainte-Alliance*.” Altogether “The Pheasant” is, as remarked above, a delightful *compagnon de voyage*, and will be found in many a portmanteau in the late October days. The ten well-produced full-page plates add much to the attractiveness of the volume.

OUR BOOK SHELF.

The Elements of Botany. By Francis Darwin, M.A., M.B., F.R.S., Fellow of Christ's College, Cambridge, and Reader of Botany in the University. (Cambridge: University Press, 1895.)

IN this little book the elements of botany are presented in a more refreshing form than is too often the case. The author has chosen to emphasise certain principles and phenomena of morphological or of physiological importance, rather than to crowd his pages with vast numbers of facts. Various plants are requisitioned to serve as illustrations of the different subjects under treatment; and thus the student will certainly acquire a clearer and more general conception of what, for instance, a flowering plant is, and how it lives, than would have been possible had only one example been selected as a type, even though this had been far more exhaustively dealt with.

There are some matters, however, in which it may be doubted whether the method of treatment adopted will commend itself equally to most botanists. Thus, although Mr. Darwin says that he advisedly puts the doctrine of alternation of generations into the background, many will doubtless regret his decision. It is true that without the introduction of a few more intermediate types, the question would possess, as the author says, but little interest for the elementary student. But in view of the great importance, both of the facts and of the comparisons based upon them, one cannot help wishing that the general bearings of the question could have been indicated somewhat more fully.

A second matter is the employment of the term *bark* in the popular, as opposed to its more technical, sense. Botanists have come to attach a special and restricted meaning to the term; and though it is no doubt highly improper to pirate English words, still this is done in every technical department, and thus, in spite of its admitted inconvenience to the beginner, we think the balance of advantage is in favour of the retention of the appropriated word in its restricted significance.

But these are cases in which there is room for difference

of opinion; there will be none at all on the question as to the merits of Mr. Darwin's book considered as a whole. It is an admirable work which both teacher and student will cordially and deservedly welcome.

The Book of British Hawk-Moths, a Popular and Practical Handbook for Lepidopterists. By W. J. Lucas. With illustrations from Nature by the Author. (London: L. Upcott Gill, 1895.)

THERE is a great flood of books on the larger and more showy British *Lepidoptera* issuing from the press at the present time; but so long as the information which they contain is fairly accurate, and they place on record a portion of the floating information derived from periodicals or personal observation, we do not see that the fact is to be regretted. At least it is a sign that an intelligent interest in entomology is now taken by a large number of persons who are not entomologists or collectors themselves; for we do not believe that there is a sufficiently large number of entomologists to buy up the large editions of popular books which are now offered to them; they must appeal to a considerable number of outsiders as well.

The book before us is restricted to a very small group of British moths, the *Sphingidæ* proper, numbering only seventeen species, several of which are possibly only casual visitors rather than permanent residents. Consequently, the author has been able to treat of the subject in considerable detail, though a good deal of the introductory part of the book deals with the collecting and preserving of *Lepidoptera*, rather from a general point of view, than as specially applicable to *Sphingidæ*. The illustrations consist of folding plain plates, representing the larva, pupa, and imago of each species, the earlier stages, when not observed by the author himself, being usually copied from Buckler's work on larvæ. There are also occasional woodcuts in the text. The letterpress is pleasantly, though sometimes hastily, written, and is fairly complete and up to date; and most of the illustrations are good. On the last plate, the names of the two bee hawk-moths appear to have been reversed, probably by a printer's error. The information given is, we believe, accurate; but every entomologist will be able to supplement it according to his own experience. Thus, it might have been stated that *Smerinthus tilie* (the lime hawk-moth) is one of the commonest of the *Sphingidæ* in the suburbs of London. *Sphinx pinastri* (the pine hawk-moth) is mentioned as sometimes found at rest on the trunks of pine trees. So it is; but it will also rest on other trees, and on the continent it is often found resting on the trunks of the poplars which often fringe the roads in the neighbourhood of pine forests.

W. F. K.

Biology Notes. Vol. i. Edited by David Houston, F.L.S. Pp. 290. (Chelmsford: Technical Laboratories, 1895.)

THIS volume is a collection of bulletins published monthly by the Technical Instruction Committee of the Essex County Council, as an aid to the teaching of biology. It contains information bearing upon the applications of biology to the industrial pursuits of the county, and notes of interest to biological students. Among the subjects of short articles are ergot and its physiological effects, bracken poisoning of cattle, biological aspects of dairying, injurious insects, diseases of cultivated plants, zoology on the Essex coast, and spraying experiments; and there are also included in the volume several detailed syllabuses of courses of practical instruction in vegetable and animal biology. The “Notes” are well illustrated, and must be of great assistance to the students in the classes controlled by the Essex County Council. Other County Councils would do well to issue monthly bulletins of the kind collected in this volume.